IN THE CLAIMS

Please amend and/or cancel the claim(s) of the captioned application, and/or add claim(s) to the captioned application, in accordance with the following annotations and/or mark-ups showing all change(s) relative to the previous version(s) of the claim(s) as required by 37 C.F.R. 1.121:

1. (Currently amended) A method of detecting fractures in a fractured zone in an Earth formation comprising the steps of:

a. propagating a plurality of acoustic waves through the fractured zone so that the plurality of acoustic waves reflect off a horizon in the formation;

b. receiving a plurality of seismic traces representative of the acoustic waves propagating through the fractured zone wherein a first portion of the seismic traces corresponds to a first window located above the fractured zone in the formation, and a second portion of the seismic traces corresponds to a second window located below the fractured zone in the formation;

c. generating a first frequency spectrum associated with the first portion of the seismic traces corresponding to the first window;

d. generating a second frequency spectrum associated with the second portion of the seismic traces corresponding to the second window;

e. superimposing the first frequency spectrum onto the second frequency spectrum, thereby generating a superimposed frequency spectrum, and defining from the superimposed frequency spectrum a low frequency and a high frequency;

f. when the low frequency and the high frequency is defined, further defining from the superimposed frequency spectrum a plurality of amplitude values, the plurality of amplitude values including: an amplitude Fa(high) of the first frequency spectrum at the defined high frequency, an amplitude Fa(low) of the first frequency spectrum at the defined low frequency, an amplitude Fb(high) of the second frequency spectrum at the defined high frequency, and an amplitude Fb(low) of the second frequency spectrum at the defined low frequency;

g. from the plurality of amplitude values, defining a t* attribute by subtracting the natural log of the ratio of Fa(low) to Fb(low) from the natural log of the ratio of Fa(high) to Fb(high) to get a numerator and dividing the numerator by a denominator which comprises the defined high frequency less the defined low frequency; and

h. plotting the t* attribute ~~on a map and assigning a unique color to the t* attribute~~.

2.-4. (Canceled)

5. (Currently amended) A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform method steps for detecting fractures in a fractured zone in an Earth formation, the method steps comprising:

a. operating on a plurality of received seismic traces, representative of a plurality of acoustic waves propagating through the fractured zone and reflecting off a horizon in the formation, to define a first portion of the seismic traces corresponding to a first window located above the fractured zone in the formation, and to define a second portion of the seismic traces corresponding to a second window located below the fractured zone in the formation;

b. generating a first frequency spectrum associated with the first portion of the seismic traces corresponding to the first window;

c. generating a second frequency spectrum associated with the second portion of the seismic traces corresponding to the second window;

d. superimposing the first frequency spectrum onto the second frequency spectrum, thereby generating a superimposed frequency spectrum, and defining from the superimposed frequency spectrum a low frequency and a high frequency;

e. when the low frequency and the high frequency are defined, further defining from the superimposed frequency spectrum a plurality of amplitude values, :including an amplitude Fa(high) of the first frequency spectrum at the defined high frequency, an amplitude Fa(low) of the first frequency spectrum at the defined low frequency, an amplitude Fb(high) of the second frequency spectrum at the defined high frequency, and an

amplitude Fb(low) of the second frequency spectrum at the defined low frequency;

f. from the plurality of amplitude values, defining a t* attribute by subtracting the natural log of the ratio of Fa(low) to Fb(low) from the natural log of the ratio of Fa(high) to Fb(high) to get a numerator and dividing the numerator by a denominator which comprises the defined high frequency less the defined low frequency; and

g. plotting the t* attribute ~~on a map and assigning a unique color to the t* attribute~~.

6.-8. (Canceled)

9. (Currently amended) An apparatus adapted for detecting fractures in a fractured zone in an Earth formation comprising:

a. a first means for operating on a plurality of received seismic traces, representative of a plurality of acoustic waves propagating through the fractured zone and reflecting off a horizon in the formation, to define a first portion of the seismic traces corresponding to a first window located above the fractured zone in the formation, and to define a second portion of the seismic traces corresponding to a second window located below the fractured zone in the formation;

b. a second means for generating a first frequency spectrum associated with the first portion of the seismic traces corresponding to the first window and for generating a second frequency spectrum associated with the second portion of the seismic traces corresponding to the second window;

c. a third means for superimposing the first frequency spectrum onto the second frequency spectrum, thereby generating a superimposed frequency spectrum, and defining from the superimposed frequency spectrum a low frequency and a high frequency;

d. a fourth means for further defining, from the superimposed frequency spectrum, a plurality of amplitude values when the low frequency and the high frequency is defined, the plurality of amplitude values :including an amplitude Fa(high) of the first frequency spectrum at the defined high frequency, an amplitude Fa(low) of the first frequency

spectrum at the defined low frequency, an amplitude Fb(high) of the second frequency spectrum at the defined high frequency, and an amplitude Fb(low) of the second frequency spectrum at the defined low frequency;

e. a fifth means for defining a t* attribute from the plurality of amplitude values by subtracting the natural log of the ratio of Fa(low) to Fb(low) from the natural log of the ratio of Fa(high) to Fb(high) to get a numerator and dividing the numerator by a denominator which is the defined high frequency less the defined low frequency; and

f. a sixth means for plotting the t* attribute ~~on a map and assigning a unique color to the t* attribute~~.

10.-12. (Canceled)

13. (Previously added) The method of claim 1 wherein the first frequency spectrum associated with the first portion of the seismic traces corresponding to the first window is generated using either Fast Fourier Transform, Cosine Correlation Transform, or Wavelet Transform.

14. (Previously added) The method of claim 1 wherein the second frequency spectrum associated with the second portion of the seismic traces corresponding to the second window is generated using either Fast Fourier transform, Cosine Correlation Transform, or Wavelet Transform.

15. (Previously added) The program storage device of claim 5 wherein the first frequency spectrum associated with the first portion of the seismic traces corresponding to the first window is generated using either Fast Fourier Transform, Cosine Correlation Transform, or Wavelet Transform.

16. (Previously added) The program storage device of claim 5 wherein the second frequency spectrum associated with the second portion of the seismic traces corresponding to the second window is generated using either Fast Fourier transform, Cosine Correlation Transform, or Wavelet Transform.

17. (Previously added) The apparatus of claim 9 wherein the second means generates the first frequency spectrum associated with the first portion of the seismic traces corresponding to the first window using either Fast Fourier Transform, Cosine Correlation Transform, or Wavelet Transform.

18. (Previously added) The apparatus of claim 9 wherein the second means generates the second frequency spectrum associated with the second portion of the seismic traces corresponding to the second window using either Fast Fourier transform, Cosine Correlation Transform, or Wavelet Transform.

19. (Currently amended) A method of detecting fractures in an Earth formation comprising the steps of:

propagating at least one acoustic wave through an Earth formation so that the acoustic wave is reflected off a horizon in the formation;

receiving a seismic trace representative of the acoustic wave propagating through the formation, a first portion of the seismic trace corresponding to a first window located above the formation and a second portion of the seismic trace corresponding to a second window located below the formation;

generating a first frequency spectrum at least partially associated with the first portion of the seismic trace corresponding to the first window;

generating a second frequency spectrum at least partially associated with the second portion of the seismic trace corresponding to the second window;

comparing the first frequency spectrum to the second frequency spectrum to define a low frequency and a high frequency;

defining an amplitude Fa(high) of the first frequency spectrum at the defined high frequency, an amplitude Fa(low) of the first frequency spectrum at the defined low frequency, an amplitude Fb(high) of the second frequency spectrum at the defined high frequency, and an amplitude Fb(low) of the second frequency spectrum at the defined low frequency;

~~scaling~~ defining a t* attribute by dividing the difference in the ratio of Fa(low) to Fb(low) and the ratio of Fa(high) to Fb(high) by the defined high frequency less the defined low frequency ~~to define a t* attribute~~; and

mapping the t* attribute.

20. (Previously added) The method of claim 19 wherein the first frequency spectrum associated with the second portion of the seismic trace corresponding to the first window is generated using Fast Fourier Transform, Cosine Correlation Transform, or Wavelet Transform.

21. (Previously added) The method of claim 19 wherein the second frequency spectrum associated with the second portion of the seismic trace

corresponding to the second window is generated using Fast Fourier Transform, Cosine Correlation Transform, or Wavelet Transform.

22. (Previously added) The method of claim 19 wherein either the first window or the second window is entirely above the formation.

23. (Previously added) The method of claim 19 wherein the defined low frequency is the lowest frequency defined by comparing the first frequency spectrum and the second frequency spectrum.

24. (Previously added) The method of claim 19 wherein the defined high frequency is the highest frequency defined by comparing the first frequency spectrum and the second frequency spectrum

25. (Previously added) The method of claim 19 wherein the first frequency spectrum is compared to the second frequency spectrum by superimposing the first frequency spectrum onto the second frequency spectrum.

26. (Currently amended) The method of claim 19 ~~wherin~~ wherein the t* attribute is defined by scaling with the difference in the natural logs of the ratios of Fa(low) to Fb(low) and Fa(high) to Fb(high).